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Life cycle assessment rules - criteria for the inclusion of product-specific life cycle assessment data ("EPD data") in the database www.baubook.at

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The original of this document has been drawn up in German (Ökobilanzregeln – Kriterien für die Aufnahme von produktspezifischen Ökobilanzdaten („EPD-Daten") in die Datenbank www.baubook.at). The German version shall be the authentic one and prevail over the English one in all matters of interpretation and construction. The English version shall be deemed to be only a translation for information purposes.

Contents

Change documentation

This document supersedes all previous versions of publication and will be replaced as soon as a new version is issued.

Changes compared to version V5.0 from 20.05.2022:

- Editorial changes
- Sections already described in the manual have been deleted.
- References to the checklist *Harmonised LCA Criteria Austria* were removed (this was withdrawn to prevent misunderstandings, as it only contained an extract from the bau EPD GmbH rules and regulations).
- Rules which are anyway subject of the recognition procedure (e.g. conformity with product category rules of CEN product TCs, specification of independent external verification) have also been deleted.

1. Introduction

In baubook, characteristic values of building physics and ecology of building products are published. This data is available free of charge for baubook users. The data can be used in the baubook building life cycle assessment calculator (eco2soft) or downloaded in XML format with a licence agreement. Via the xml interface, the data can be imported, for example, into common programmes for the preparation of a building or energy performance certificate incl. "Oekoindex[1] "-calculation.

1.1 Abbreviations

AP	Acidification potential of soil and water
AT rules	Harmonised Life Cycle Assessment Rules Austria
EP	Eutrophication potential
EPD	Environmental Product Declaration
GWP-biogenic	Global warming potential, biogenic
GWP fossil	Global warming potential, fossil
GWP-total	Global warming potential, total
OI3	Oekoindex 3
PENRE	Non-renewable primary energy, as energy carrier
PENRM	Non-renewable primary energy, as raw material
PENRT	Non-renewable primary energy, total
PERM	Renewable primary energy, as raw material
PERE	Renewable primary energy, as energy carrier
PERT	Renewable primary energy, total
PKR	Product Category Rules
POCP	Formation potential for tropospheric ozone
ODP	Depletion potential of the stratospheric ozone layer
RSL	Reference useful life

[1] http://www.baubook.at/oekoindex/

1.2 Life cycle assessment methods

1.2.1 Professional background

LCA datasets based on the European standard EN **15804+A1** "Basic rules for the product category construction products" (EN 15804:2014 with Amendment A1) are currently used as the basis for LCA in building assessment programmes and funding schemes. In autumn 2019, a new version of EN 15804 has been published, EN **15804+A2** (Amendment A2). It is expected that environmental product declarations (EPDs) based on both versions of the standard will continue to coexist for several years.

For product life cycle assessments, basic and process data on energy supply, transport, chemicals, etc. are required. The **ecoinvent** database is one of the world's leading basic databases. It is used as a background database in most Austrian programmes. In Germany, the basic database **GaBi is** widely used.

Furthermore, EPD data can be modelled very differently depending on the product category rule (PKR) requirements in addition to the applicable standards. This can vary greatly from country to country, from programme operator to programme operator or from application to application.

1.2.2 Illustration in baubook

In baubook, LCA data can be displayed according to both standard versions (EN 15804+A1 and EN 15804+A2). Furthermore, in addition to data based on the background database ecoinvent (obligatory for the Oekoindex OI3 calculation widely used in Austria), data based on GaBi can also be displayed.

Data sets with different LCA methods are shown separately in baubook:

1. Ecological parameters according to EN 15804+A1 based on ecoinvent
2. Ecological parameters according to EN 15804+A1 based on GaBi
3. Ecological parameters according to EN 15804+A2 based on ecoinvent
4. Ecological parameters according to EN 15804+A2 based on GaBi

The separate presentation is necessary because LCA data with different background databases and according to different standard versions are not comparable with each other:

1. The new standard EN 15804+A2 brought comprehensive changes to the impact indicators. Impact indicators calculated according to the two versions of the standard EN 15804+A1 or EN 15804+A2 cannot be compared with each other and may not be used together at building level.
2. Both background databases, ecoinvent and GaBi, are compiled according to current scientific standards and high quality standards, yet the results of life cycle assessments based on these databases sometimes differ considerably.

1.3 Application of life cycle assessment data

1.3.1 Life cycle assessment data for Austrian housing subsidies and for building permits in Salzburg

The Oekoindex OI3 is an aggregated eco-indicator composed of the three indicators "primary energy content, non-renewable" (PENRT), "global warming potential" (GWP total) and "acidification potential" (AP). The OI3 is used in a large number of Austrian housing subsidy and building assessment systems. In the Salzburg Building Technology Ordinance, a modified eco-indicator is used that is formed from PENRT and GWP ("Building Material Primary Energy Indicator" B_i).

For the calculation of the Oekoindex OI3 and the Salzburg B_i , the life cycle assessment data according to EN 15804+A1 based on the background database ecoinvent are currently to be used. For more information on the eco-index see: http://www.baubook.info/oekoindex/

1.3.2 Life cycle assessment data for QNG, BNB and DGNB/ÖGNI

In the German assessment systems Quality Seal Sustainable Building (QNG), Assessment System Sustainable Building (BNB) or DGNB/ÖGNI certification, on the other hand, the use of GaBi-based life cycle assessment data according to ÖKOBAUDAT (www.oekobaudat.de) is mandatory.

2. Scope of application

2.1 Scope

This document describes the inclusion criteria for product-specific LCA data in baubook. It covers the product categories building materials and building services components. The LCA data can be submitted in the context of Environmental Product Declarations (EPDs) or, in exceptional cases, equivalent LCA projects.

2.2 Validity of this document

In any case, this document applies to all LCA data submitted for quality assurance after its publication in the database www.baubook.at.

In order to ensure the consistency of the LCA data in baubook, the document may also become valid for LCA data already published in www.baubook.at. baubook GmbH reserves the right to withdraw LCA data sets that contradict result-relevant rules of this document after a transition period of six months.

3. Life cycle assessment rules

3.1 Formal requirements for life cycle assessment data

3.1.1 Environmental Product Declarations (EPD)

All LCA data published in baubook should in principle originate from environmental product declarations (EPD) with programme operation according to EN ISO 14025 and independent external verification.

The inclusion of LCA data that was not prepared within the scope of an EPD is only carried out in exceptional cases:

- The guideline values for the Oekoindex OI3 calculation in Austria (generic data sets for the ecoinvent-based building life cycle assessment) are provided by the IBO on the basis of worst-case scenarios. For more information on the IBO guideline values, see www.baubook.info/richtwerte.
- Generic and representative benchmarks for building life cycle assessment on a GaBi basis are taken from the ÖKOBAUDAT database. For more information on ÖKOBAUDAT, see www.oekobaudat.de.
- Representative, company- and product-neutral data, which have been compiled, for example, within the framework of research work, can be of great importance for specific product groups. The requirements for these data are otherwise analogous to those for EPD data.

3.1.2 Validity of the EPD

The EPD must be valid for at least 3 months after activation of the product in baubook.

The maximum period of validity for records accepted in baubook is five years from the date of issue of the EPD. The end of the validity period must be indicated in the data set. baubook GmbH reserves the right not to include new LCA data that are about to expire or to remove expired data sets from the database.

3.1.3 Language

The EPDs can be submitted in German or in English. This also applies to the project report and other verification documents if this is required for the conformity assessment.

3.1.4 Conformity with EN 15804

The LCA data shall meet the requirements of EN 15804 "Sustainability of construction works - Environmental declarations for products - Basic rules for the product category construction product".
The EPD must clearly indicate which version of EN 15804 it refers to (currently: EN 15804+A1 or EN 15804+A2).

Proof is provided by means of a statement / declaration of conformity in the EPD.

3.1.5 Independent external verification

All LCA data included in baubook must be verified by independent third parties.

Verification: Signature of the independent external verifier in the EPD

Note: The *Harmonised LCA Rules Austria* (see chapter 3.2) and the ÖKOBAUDAT principles (see chapter 3.3) set additional requirements for verification, which are verified in the course of the recognition of EPD data sets.

3.1.6 Documentation of the background database

For the use of generic data in LCAs, the following applies: The background database must be identified in the EPD.

Only one background database (GaBi or ecoinvent) should be used. If, in exceptional cases, data from other sources have to be used (e.g. because no corresponding data are available in the respective background database), this must be documented and justified.

Note: Data sets for the Oekoindex OI3 calculation must be based on the ecoinvent background database for consistency reasons. For LCA data calculated on the basis of another database (e.g. GaBi), either a new impact assessment and primary energy calculation based on ecoinvent must be carried out or it must be demonstrated with the help of this conversion that comparable results would be achieved with ecoinvent (see also baubook EPD Data Manual, point 3.3.4).

3.1.7 Completeness of the indicators

For each module that is declared, at least the following indicator values must be available for life cycle assessments, as these are required for the common building balances:

Life cycle assessments according to EN 15804+A1:

Indicator	Abbreviation	Unit
Renewable primary energy - as an energy source	PERE	MJ
Renewable primary energy - as a raw material	PERM	MJ
Non-renewable primary energy - as energy source	PENRE	MJ
Non-renewable primary energy - as raw material	PENRM	MJ

Global warming potential - biogenic	GWP-biogenic	kg CO2 eq.
Global warming potential - fossil	GWP- fossil	kg CO2 eq.
Acidification potential of soil and water	AP	kg SO2 eq.
Eutrophication potential	EP	kg (PO4)3- eq.
Formation potential for tropospheric ozone	POCP	kg C2H2 eq.
Depletion potential of the stratospheric ozone layer	ODP	kg CFC 11 eq.

Life cycle assessments according to EN 15804+A2:

Indicator	Abbreviation	Unit
Renewable primary energy - as an energy source	PERE	MJ
Renewable primary energy - as a raw material	PERM	MJ
Non-renewable primary energy - as energy carrier	PENRE	MJ
Non-renewable primary energy - as raw material	PENRM	MJ
Global warming potential - biogenic	GWP-biogenic	kg CO2 eq.
Global warming potential - fossil	GWP- fossil	kg CO2 eq.
Acidification potential, cumulative exceedance	AP	mol H+ eq.
Eutrophication potential - freshwater	EP-freshwater	kg P eq.
Eutrophication potential - salt water	EP-marine	kg N-eq.
Eutrophication potential - land	EP-terrestrial	mol N eq.
Formation potential for tropospheric ozone	POCP	kg NMVOC eq.
Depletion potential of the stratospheric ozone layer	ODP	kg CFC 11 eq.

Calculated indicators:

The following indicators are calculated from the sub-indicators. They can therefore not be entered in baubook.

Indicator	Abbreviation	Unit
Global warming potential - total	GWP	kg CO2 eq.
Renewable primary energy - total	PERT	MJ
Non-renewable primary energy - total	PENRT	MJ

Exception

For ecological parameters according to EN 15804+A1 based on GaBi, the entry of the GWP-total is also permissible without specifying the sub-indicators. Justification: The transparent breakdown into GWP-biogenic and GWP-fossil was not prescribed by EN 15804+A1 and was therefore not practised in Germany.

3.1.8 Declaration of the phases of life

The data for modules A1 to A3 can also be transmitted only aggregated (module A1-A3) according to EN 15804.
The data are to be reported in absolute figures over the total observation period (not per year RSL).
Rules for the declaration of the disposal phase (modules C to D) see section 3.4.

3.1.9 Correspondence "EPD product“ with "baubook product“

The products declared in baubook ("baubook products") must be assignable to the products declared in the EPD ("EPD products") (see baubook EPD Data Manual, chapter 4.1).

3.1.10 Special rules for certain types of data

For certain data types (sector EPDs, representative data, etc.) specific requirements apply (see baubook EPD Data Manual, chapter 4.2).

3.2 Requirements for life cycle assessment data based on ecoinvent

Life cycle assessment data based on ecoinvent must comply with the *Harmonised Life Cycle Assessment Rules Austria* ("AT Rules"). These rules are based on:

- The EN 15804 *Sustainability of construction works - Environmental declarations for products - Basic rules for the product category construction product*,
- the supplementary product category rules of the CEN product TCs reviewed by CEN/TC 350,
- the LCA rules in the *Management System Handbook (MS-HB), Chapter 5 of* Bau-EPD GmbH and the specific product category rules of Bau-EPD GmbH (www.bau-epd.at/pkr/liste),
- the Guidelines for Quality and Verification of the ECO Platform (www.eco-platform.org).

Note: For the recognition of LCA data, it is recommended to have the conformity with the *Harmonised LCA Rules Austria* already checked during the EPD verification.

For details on the admission process, see the manual, point 3.3.

3.3 Requirements for life cycle assessment data based on GaBi

Life cycle assessment data based on GaBi must comply with the *Specific Requirements for Modelling and Determination of Characteristic Values for Life Cycle Assessment Data Sets of* ÖKOBAUDAT (*Principles for the Inclusion of Life Cycle Assessment Data in the Online Database ÖKOBAUDAT*, Section 5.3) (https://www.oekobaudat.de/service/downloads.html).

For details on the admission process, see the manual, point 3.4.

3.4 Rules for the declaration of the disposal phase

For the declaration of the disposal phase (modules C1 to C4 and D), the following rules apply in baubook:

1. There are eight predefined scenarios: Reuse, Recycling, Secondary fuel, Energy recovery, Thermal disposal, Landfill, Multi-component, Deconstruction.
2. The LCA data must be assignable to one (or more) of these scenarios. Only "unique" scenarios are permissible.
3. In order to make the "Module D" usable in building balancing, a distinction is made in baubook between:
   - Module "D from A5“
   - Module "D from C" (D from all disposal phases C1-C4) and
   - Module "D" (D from all life phases as defined in ÖNORM EN 15804)
4. Substance inherent properties such as the calorific value or biogenic carbon content of fluxes that exceed the product system boundary shall always be passed on according to the physical properties.

3.4.1 Explanations of the combustion scenarios

According to EN 15804, the three combustion scenarios differ as follows:

Thermal disposal

- The waste has not yet reached "end-of-waste" status before incineration.

- The waste incineration plant has an R1 value ≤ 0.6.
- This is a removal process declared in the C4 module.

Energy recovery

- The waste has not yet reached "end-of-waste" status before incineration.
- The waste incineration plant has an R1 value > 0.6.
- Energy recovery process declared in module C3.

Secondary fuel

- The waste has reached the "end-of-waste" status before incineration, i.e. the waste leaves the system as the product "secondary fuel".
- Waste processing into secondary fuel is declared in module C3.
- The combustion process and the credits associated with the combustion are declared in module D.

3.4.2 Explanations of "clear" scenarios

Values can be declared for several disposal scenarios, but each disposal scenario must be calculated and declared separately. For example, in the "recycling" scenario, only this should really be considered, i.e. 100 % of the waste stream follows the "recycling" route. If recycling also produces substances that have to be landfilled or incinerated, then these also clearly belong to the "Recycling" scenario. Mixed scenarios, on the other hand, are created on the basis of statistical data (e.g. 43 % of the waste stream goes to the "recycling" route and 57 % to "landfilling"). The declaration of such mixed scenarios is a hindrance for scenario building on building level and currently not possible in baubook. Users can create mixed scenarios at building level themselves on the basis of the 100 % scenarios.

3.4.3 Explanations to Module D

The information module D shows the environmental benefits or burdens from material or energy recovery of substances leaving the product system. According to EN 15804, module D feeds on flows from all other life phases from A4 onwards (transport to the construction site). Only the manufacturing phase (A1-A3) is regulated separately (with co-product consideration). In module D, for example, the benefits / burdens for the recycling of packaging materials from module A5 can be included as well as those for the energy recovery of the product in module C3.

For many applications, there is a need to be able to read out the benefits / burdens from the disposal of the product itself (the flows from module C1 to C4 into module D). This transparency is not provided by the current version of EN 15804 in module D. Therefore, it was determined for baubook that the flows from modules C1 to C4 should be shown separately in module D.

3.4.4 Explanations of substance-inherent properties

Substance-inherent properties are properties that result from the substance itself, such as the calorific value or the biogenic carbon content. The calorific value of renewable or non-renewable raw materials used as materials is mapped in PERM or PENRM, the biogenic carbon content in GWP-biogenic. If a substance leaves the product system, then these inherent properties are to be added to the substance according to the physical flows. This means that PERM, PENRM and GWP-biogenic are to be entered in the module in which the substance enters the system and in the module in which it leaves the system again. The same applies to those modules in which the substances are transformed (usually burned). Thus, PERM, PENRM and GWP-biogenic for combustible materials from biogenic raw materials are to be booked out in Module C in any case, regardless of the disposal scenario. In the case of conversion (incineration) within the system boundaries, the value is to be added to PERE or PENRE.

3.4.5 Reference to specific regulation for the clearing of disposal procedures

A document on the accounting of disposal processes for products according to modules C1 - C4 and D is currently being prepared (planned publication 2023). These rules are intended to provide additional assistance for the life cycle assessment of the disposal phase.

4. References

4.1 Standards

EN 15804+A1 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products. Austrian version: ÖNORM EN 15804: 2014 04 15 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products, Date of issue: 2014 04 15

EN 15804+A2 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products. Austrian version: ÖNORM EN 15804:2020 02 15 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products, Issue date: 2020-02 15

4.2 Construction EPD GmbH

MS-HB Core Document EPD Management System Manual for the preparation of Type III Environmental Product Declarations. Bau EPD GmbH. as amended: Online: https://www.bau-epd.at/pkr/allgemeine-pkr-und-mitgeltende-dokumente

Product-specific PCR Product-specific product category rules of Bau-EPD GmbH as amended: Online: https://www.bau-epd.at/pkr/liste

4.3 BBSR / ÖKOBAUDAT

ÖKOBAUDAT principles Principles for the inclusion of LCA data in the online database ÖKOBAUDAT. as amended: Online: https://www.oekobaudat.de/service/downloads.html

Recognised EPD programme operators for data delivery to ÖKOBAUDAT. Online directory: https://www.oekobaudat.de/anleitungen/datenlieferanten.html